68

EFFECTS OF VIDEO-BASED HOME EXERCISE ON CLINICAL AND RADIOGRAPHIC OUTCOMES IN ADULTS WITH KNEE OSTEOARTHRITIS: A ONE-YEAR RANDOMIZED CONTROLLED TRIAL

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Purpose: Previous systematic reviews conclude that exercise therapy has beneficial effects on pain and physical function of the population with osteoarthritis (OA) of the knee. However, its positive post-treatment effects on pain and physical function decline over time. Exercise adherence has been shown to be an important predictor of long-term outcome in exercise therapy. Video media can be an effective means of delivering exercise instruction. Therefore, use of a home exercise video could enhance adherence to prescribed exercise program. No published research to date has investigated the effectiveness of a home exercise video for patients with knee OA compared with conventional home exercise without video media. Then we have hypothesized that video-based home exercise could enhance adherence to prescribed exercise program and produce substantial improvements in pain, physical function and quality of life in patients with knee OA and also prevent radiographic progression of knee OA compared with conventional home exercise without video media. The purpose of the present study was to test this hypothesis by a one-year randomized controlled trial.
Methods: One hundred and seven subjects who fitted the following criteria were randomized to a DVD-based exercise (DVD) group or a control group by a computer-generated random number. Entry criteria were defined as knee pain, age over 50 years old, and radiographic evidence of OA (Kellgren-Lawrence Grade 2, 3, or 4). Subjects in the DVD group received a DVD-based program encompassing muscle stretching, active ROM exercises, and five forms of muscle strengthening and use it during home exercise. Subjects in the control group initially received detailed verbal and hands-on instruction in a home-based program of a quadriceps exercise program. Subjects in both groups were evaluated after 3, 6, and 12 months and compared with the baseline scores. Measured outcomes were self-reported exercise adherence collected from diaries, knee pain with the VAS, the WOMAC, SF-8, the BMI and radiographic OA parameters (i.e. medial minimum joint space width, medial joint space area, medial osteophyte area, and femorotibial angle (FTA)) using the knee osteoarthritis computer-aided diagnosis (KOACAD) measuring system.
Results: Concerning exercise adherence, subjects in the DVD group performed the prescribed exercise 5.3, 5.0 and 3.8 times in a week at 3, 6 and 12 months, while those in the control group performed the prescribed exercise 3.9, 3.7 and 4.1 times, respectively. The numbers of exercise times in the DVD group were significantly higher than those in the control group at 3 and 6 months, although there was no significant difference between groups at 12 months. The reduction in walking pain was significantly greater in the DVD group than in the control group at 3, 6, and 12 months. The improvements in all categories of WOMAC and physical component summary of SF-8 were significantly greater in the DVD group than in the control group at 3, 6, and 12 months. There were no significant differences in the SF-8 mental component summary or BMI between two groups at 3, 6, or 12 months. Regarding radiographic OA progression of the knee, the DVD group showed significant increase in FTA at 12 months compared with the baseline values, while we could not find significant progression in the medial minimum joint space width, medial joint space area, or medial osteophyte area. There were no significant differences between two groups in the changes of any radiographic parameters at 3, 6, or 12 months from the baseline values.
Conclusions: The present one-year randomized controlled trial showed that video-based home exercise can enhance adherence to prescribed exercise program for 6 months and can produce substantial improvements in pain, physical function and quality of life in patients with knee OA at one year. However, this video-based home exercise cannot prevent radiographic progression of the knee OA.

69

PROSPECTIVE STUDY OF NEW KNEES FUNCTIONAL BRACE AND NEW TYPE INSOLE FOR MEDIAL OSTEOARTHRITIS KNEE

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Purpose: There is controversial evidence regarding whether foot orthoses or knee braces improve pain and function or correct malalignment in the patients with osteoarthritis (OA) of the medial knee compartment. Recently new type insole and new lighter knee brace have been developed since last ten years. There was no prospective study to compare the new insole to new knee brace. We prospectively evaluated whether new type laterally wedged insoles and new functional valgus braces would reduce pain, improve the functional scores comparable to controls during one year.
Patients and Methods: Enrolled patients confirmed medial compartment of knee OA by radiography. They were divided by 3 groups: Control group was consisted of 51 patients, insole group was in 59 patients, and brace group was in 19 patients. The evaluations had used clinical knee functions, objective findings and gait analysis.
Results: With Kellgren-Lawrence radiographic scores there were significantly difference among three groups. The patients with grade II in control group were significantly much than ones in other two groups. The patients with grade III and IV in brace group were significantly much than ones in the control group. The gait ability after each treatment was improved in all groups comparing with one before the treatments. The visual analog scale (VAS) before the treatment in the brace group were significantly higher than one in control group, but after 1 year the differences between these two groups were disappeared. In gait analysis, while there were no significantly different among three groups after 12 months, the medial varus moment in all groups were gradually decreased after 12 months. The gait speeds in insole and brace groups were significantly increased after 6 and 12 months to comparing to the starting point.
Conclusion: In this study we evaluated the orthoses treatements improved the gait ability and pain score. Specially, the new type insole was effective for the OA with grade II and III in K-L classification, and the new brace was also effective for the OA with grade III and IV. Furthermore, when these orthoses treatment continued more than 6 months, it is more effective than the starting points.

70

RBPJK-DEPENDENT NOTCH SIGNALING IS REQUIRED FOR ARTICULAR CARTILAGE AND JOINT MAINTENANCE

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Purpose: Osteoarthritis (OA) is one of the most common and painful musculoskeletal diseases known to affect tissues throughout the entire joint. Hallmarks of the disease include: progressive loss of the articular cartilage, meniscal degeneration, subchondral bone sclerosis, synovial proliferation, and osteophyte formation. While a variety of OA related risk factors have been identified such as age, sex, traumatic injury, and obesity, only a few genetic factors have been linked to OA. Recently, we demonstrated that the Notch signaling pathway is a critical regulator of skeletal progenitor cell differentiation during both chondrogenesis and osteogenesis during development, and may also play a significant role in regulating chondrocyte and osteoblast function during adult life. We therefore set out to determine whether the RBPjk-dependent Notch pathway is required for normal joint development and maintenance in both embryonic and adult mice.
Methods: To determine the role of canonical Notch signaling during joint development and maintenance in vivo, we generated Notch loss-of-function conditional mutant mice using Rbpjk floxed alleles in combination with the Prx1Cre transgene to specifically remove Notch activity in skeletal progenitors that give rise to all joint tissues (Prx1Cre; Rbpjk f/f mice). We performed micro-CT imaging, histology, histomorphometry, in situ hybridization (ISH), immunohistochemistry (IHC), TUNEL staining, and polarized light microscopy to assess articular cartilage, meniscus, synovium, and subchondral bone changes during joint development and maintenance using the hindlimbs isolated from E14.5, E18.5, 2-week, 2-month, 4-month, and 8-month old mice.
Results: Histological, ISH, and IHC analyses of Prx1Cre; Rbpjk f/f and littermate control mice at E14.5 and E18.5 revealed that mutant mice had